

## Study Guide

For use with pages 648–652

**GOAL** Recognize how statistics can be misleading.

### VOCABULARY

Bar and line graphs could be misleading if the scale appears to distort the data in some way. An *average* can be represented by the mean, the median, or the mode. You may get a misleading impression of a data set if the average that is used does not represent the data well.

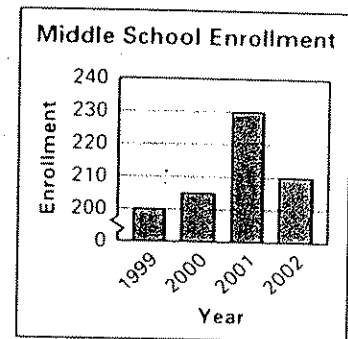
### EXAMPLE 1 Potentially Misleading Graphs

The bar graph shows the enrollment in a middle school in 4 different years. Without using the scale, compare enrollment in 1999 and 2001. Then compare enrollment using the scale.

#### Solution

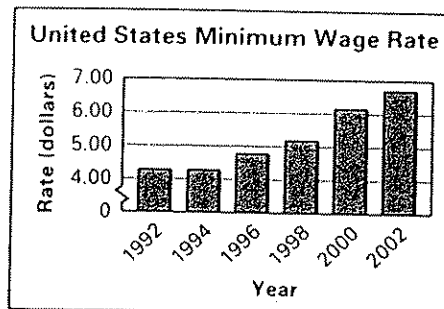
Enrollment in 1999 appears to be about  $\frac{1}{4}$  the enrollment in the year 2001, because the 1999 bar is  $\frac{1}{4}$  as high as the 2001 bar.

Enrollment in 1999 was actually about 87% of the enrollment in 2001, because  $200 \div 230 \approx 87\%$ . The break in the scale distorts the relative heights of the bars.



### Exercises for Example 1

In Exercises 1 and 2, use the following information. The bar graph shows the United States minimum wage rate from 1992 to 2002.



- Without using the scale, compare the minimum wage rate in 1992 and 2002. *1992 appears to be 1/3 of that in 2002*
- Compare the <sup>min wage</sup> minimum wage rate in 1992 and 2002 using the scale. *1992 min wage was 64.9% of that in 2002*

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## EXAMPLE 2 Misleading Averages

An automobile dealer says that the average miles per gallon (mi/gal) of gasoline for six car models he sells is 19. The miles per gallon of the six models are

17, 15, 16, 16, 14, and 36.

Does 19 mi/gal describe the average miles per gallon well? Why might an automobile dealer use this average?

*No - it's high b/c of 36*

*b/c greater miles/gallon sells cars*

### Solution

The mean, 19 mi/gal, does not describe the data well because it is higher than the miles per gallon of all but one of the vehicles. The automobile dealer might use 19 mi/gal as the average to convince potential buyers that the six models use gasoline efficiently.

### Exercise for Example 2

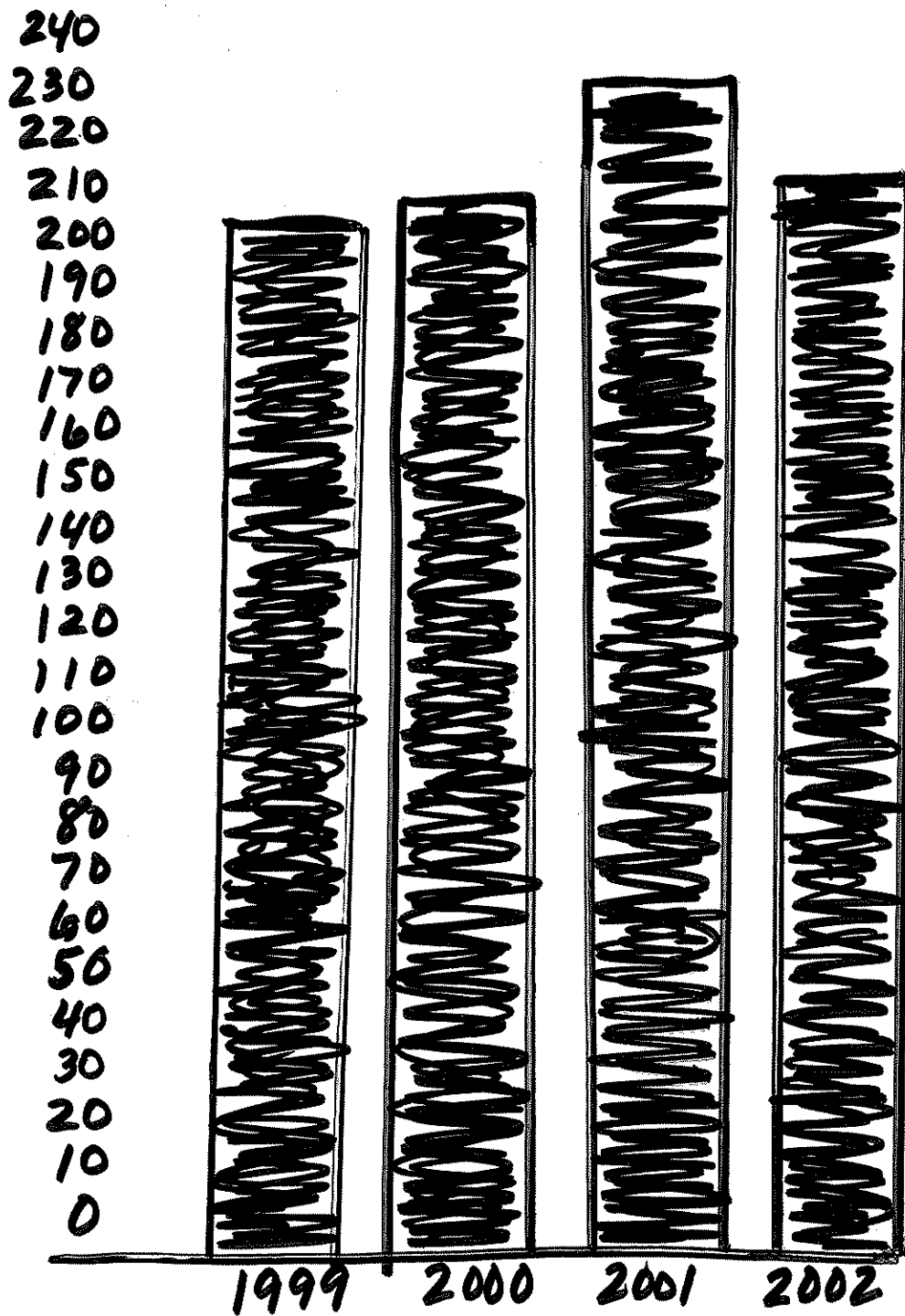
- Describe an average that more accurately shows the average miles per gallon for the six vehicles.

*either median or mode - both are 16 mi/gal*

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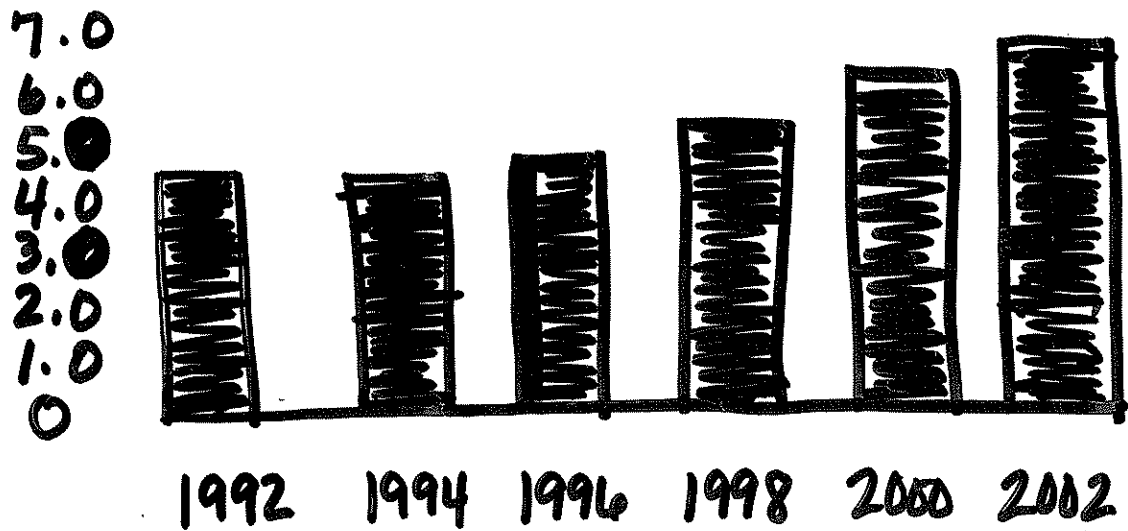
Ex. 1

middle School Enrollment



# Study Guide 13.4

## U.S. Minimum Wage Rate



1992 - \$ 4.25

2002 - \$ 6.50 - \$ 6.75

64% difference